

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 06-172855

(43)Date of publication of application : 21.06.1994

(51)Int.Cl. C21D 8/10
// C22C 38/00
C22C 38/14
C22C 38/54

(21)Application number : 04-330657

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(22)Date of filing : 10.12.1992

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(54) PRODUCTION OF SEAMLESS STEEL TUBE WITH LOW YIELD RATIO AND HIGH TOUGHNESS

(57)Abstract:

PURPOSE: To obtain a seamless steel tube having low yield ratio and high toughness by specially controlling steel components and hot rolling conditions, respectively.

CONSTITUTION: A billet of a steel which has a composition consisting of, by weight, 0.03-0.20% C, 0.01-2.5% Si, 0.15-2.5% Mn, $\leq 0.020\%$ P, $\leq 0.010\%$ S, 0.005-0.1% each of Al, Ti, and Nb, $\leq 0.01\%$ N, and the balance Fe and containing, if necessary, prescribed amounts of Cr, Mo, Ni, V, B and/or Ca, Co, and Cu is used. This billet is heated up to $\geq 1100^{\circ}\text{C}$ and hot-pierced, and the resulting hollow tube stock is cooled, prior to former-stage and final-stage cross helical rollings, down to a temp. between the Ar3 point and 1100°C and a temp. between the Ar3 point and 900°C , respectively, and subjected to forming with a reduction ratio of wall thickness cross section of 20-70% by means of respective cross helical rolling mills. After the rate of nonrecrystallized structure is regulated to $\geq 40\%$ based on the whole thickness and cross section and continuous hot rolling for shape straightening is done, the hollow tube stock whose temp. is dropped to a temp. between the Ar3 point and 900°C is heated up to $900-950^{\circ}\text{C}$, hot-finish-rolled at $\geq (\text{Ar3 point} + 50^{\circ}\text{C})$ finishing temp., and air-cooled at a rate of $\leq 10^{\circ}\text{C/s}$.